

# FISH FAUNA, ABUNDANCE AND DISTRIBUTION IN CHALAKUDY RIVER SYSTEM, KERALA<sup>1</sup>

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(With one text-figure)

**Key words:** Freshwater fishes, Chalakudy river, Kerala, Anaimalai hills, Nelliampathy hills, *Barilius bendelisis*, *Glyptothorax lonah*.

Chalakudy river originating from the Anaimalai and Nelliampathy hill ranges was surveyed from November 1996 to February 1998, and the total number of fish species recorded from this river reached up to ninety-eight. *Glyptothorax lonah* is a new record for Kerala. *Barilius bendelisis* was recorded for the first time from a west flowing river in Kerala. *Hypselobarbus kurali*, *Puntius dorsalis*, *Travancoria jonesi*, *Tetraodon travancoricus*, *Nemacheilus guentheri*, *Ompok malabaricus*, *Euryglossa orientalis* and *Macropsinosa cuja* were reported for the first time from this river. Lowland (<75 m from sea level) and midland (75 to 500 m above msl) have a greater number of species than highland (500 to 750 m above msl) and high ranges (>750 m above msl). This is because of the migratory species recorded in the lowland and midland and also because this area is connected with paddy fields or other wetlands.

## INTRODUCTION

The Western Ghats are one of the most important biodiversity hot spots in India. In spite of adverse human impacts, they still support a good number of endemic flora and fauna, including fish fauna. Several endemic fish species were recorded from southern Western Ghats (Jayaram 1981; Talwar and Jhingran 1991). Study on fresh water fishes of Kerala started with Day's FISHES OF MALABAR (1865) and FISHES OF INDIA (1889) After that, most of the studies on fishes were conducted in southern Western Ghats i.e. south of Palghat gap during the forties and fifties, and include Pillay (1929), John (1936), Hora and Law (1941), Hora and Nair (1941), Raj (1941), Chacko (1948), Menon (1950) and Silas (1951).

The earliest specific study, in the higher reaches of Chalakudy river system in Anaimalai and Nelliampathy Hills was carried out by Silas

(1951). Later, Thobias (1973) did a detailed study of the fishes in Trichur dist. while Antony (1977) studied the hill stream fishes in the same area. Study on the fishes of the lower reaches and the wetlands in Trichur dist. was done by Inasu (1991). From Chalakudy river, Pethiyagoda and Kottelat (1994) have reported three new species, viz, *Osteochilichthys longidorsalis*, *Travancoria elongata* and *Horabagrus nigricollaris* from Vettilappara, 26 km upstream of Chalakudy town and Shaji *et al.* (1996) have reported a new species *Garra surendranathanii* from Orukomban.

There is, however, no detailed study of the whole Chalakudy river system. We have carried out a detailed survey in the Chalakudy river system including the portions lying in Tamil Nadu State and the results thus obtained were collated with past records to get a clear picture of the present distribution and abundance of fishes.

## STUDY AREA

River Chalakudy is 144 km long, and its basin lies between latitudes 10° 10' 0" and 10° 33' 30" N and longitude 76° 17' 0" and 77° 4' 0" E.

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It originates from Anaimalai and Nelliampathy hills and joins Periyar river at Elanthikara, a few kilometres before flowing into the sea. The main tributaries of this river are Sholayar, Parambikulam, Kuriarkuty and Karappara. The Sholayar and Parambikulam rivers originate from Anaimalai at 1066 m and 1676 m above msl respectively. Sholayar flows westwards for 44.8 km and then turns northwards and joins Parambikulam river, 1.6 km before Orukombankutty at an elevation of 473 m. Parambikulam river flows parallel and north to Sholayar. Kuriarkuty river also originates from the Anaimalai hills and joins Parambikulam river. Karapara river originates from the Nelliampathy hills of Palakkad dist. at an elevation of 914 m, flows west and turns southwest till it joins Parambikulam river at Orukombankutty; from this point the river is known as Chalakudy river. Before its confluence with Periyar there are some smaller streams such as Charppa thodu, Kannamkuzhi, Pillaparathodu and Arurmuzhi. Till it reaches the plains, the river has a rocky bottom with deep crevices and pools, rapids and falls, a famous one being Athirapilly falls.

Chalakudy river has a catchment area of 1,704 sq. km and the total runoff is  $3,121 \times 10^6$  m<sup>3</sup>. There are a number of reservoirs in the river system, viz. Parambikulam, Thunakadavu, Peruvarpallam, Malakkapara, lower Sholayar, and Poringalkuthu.

#### METHOD

During 1996-97 the survey was carried out in Nelliampathy, Anaimalai and Cardamom hills (south of the Palghat gap). This includes Parambikulam Wildlife Sanctuary and part of Indira Gandhi Wildlife Sanctuary. Post-monsoon period was suitable for fish survey. 1:50,000 Survey of India topo sheets were used to pinpoint the approachable sites and to identify the stream order. At the sampling site, careful observation was made without disturbing the water and visual

count for roughly 2 sq. m area was carried out if the water was clear. In the post-monsoon period, the water was rarely turbid. Various sampling methods such as cast net, scoop net, gill net and a circular net with very small mesh and sinkers on the edge, were used to catch different species, adding to the visual count. A constant number of efforts was made to reduce statistical bias. Samples were preserved in 10% formalin and kept for identification and further studies. Fishes were identified mainly from Jayaram (1981) and Talwar and Jhingran (1991).

Based on altitude, the study area was classified into four main divisions; (1) Lowland (<75 m from sea level), (2) Midland (75 to 500 m above msl), (3) Highland (500 to 750 m above msl), (4) High ranges (>750 m above msl) Distributional variation and seasonal abundance of the species were closely observed.

#### RESULTS AND DISCUSSIONS

As the western side of the Western Ghats is narrow, the rivers flowing westward are also smaller than the east flowing rivers. Moreover, in these river systems, separated as they are from each other by hills, easy mixing of species is difficult. Though these rivers are small in size, the number of fish species is high. Chalakudy river is one of the important rivers in Kerala with highly diverse fish fauna.

#### Fish Fauna

During the present survey, 83 species were recorded. A complete list of fish from this river, including past records, gives a total number of 98 species, 34 families and 10 orders. Previous records that have been included in this list are of Silas (1951); Thobias (1972); Antony (1977); Inasu (1991); Pethiyagoda and Kottelat (1994) and Biju *et al.* (1998, 1999). The most abundant order in this report is Cypriniformes followed by Perciformes and Siluriformes. The family with the maximum number of representatives is Cyprinidae. The most abundant genus in this

river is *Puntius* followed by *Mystus*. This list includes typical primary freshwater fishes, secondary freshwater fishes or migratory fishes and wetland species.

Silas (1951) studied the Ponnani drainage and Periyar drainage system (he considered Chalakudy river as a part of Periyar because it is connected with Periyar just before it joins the Arabian Sea). He recorded eight species from Nelliampathy hills. The works of Thobias (1973), Antony (1977) and Inasu (1991) were concentrated only in the Thrissur (= Trichur) dist. Hence their list of species also included fishes from Karuvannur and Kecheri rivers. Thobias (1973) collected 58 species of freshwater fishes from Thrissur dist. of which 51 were found in the Chalakudy river. Antony (1977) described 48 species of hill stream fishes from Thrissur district, of which 42 species were from Chalakudy river. Inasu (1991) studied the distribution of inland fishes and listed 57 species, of which 17 species were from the Chalakudy river. Pethiyagoda and Kottelat (1994) have reported three new species from this river under the genera *Travancoria*, *Osteochilichthys* and *Horabagrus*. Shaji *et al.* (1996) reported a new species under the genus *Garra*. Biju *et al.* (1999) reported 40 species of freshwater fishes of Parambikulam Wildlife Sanctuary. 15 species that have been recorded by previous workers were not located by us during the present survey.

*Hypselobarbus kurali*, *Puntius dorsalis*, *Travancoria jonesi*, *Macrospinosa cuja*, *Euryglossa orientalis*, *Nemacheilus guentheri*, *Ompok malabaricus* and *Tetraodon travancoricus* are reported for the first time from this river.

*Tor khudree* is considered as a rare and endangered species in Kerala. This species was recorded in good numbers from upstream stretches. Moreover, one specimen of this species was collected from the lowlying Kanakkankadavu area. *Tor khudree* is a sport fish, and specialised methods to catch fish in the river have resulted in this species being endangered and listed accordingly. One specimen recorded from Kanakkankadavu showed it can thrive in lowland, midland and highland streams.

The fishes recorded from the present survey and the past records (\*) are given in Table 1. The fishes are classified according to Talwar and Jhingran (1991) with modifications from Menon (in press).

#### Notes on some interesting species

1. *Garra surendranathanii* Shaji *et al.* 1996. *Garra surendranathanii* Shaji *et al.*, JBNHS, 93(3): 572-575

13 specimens of *G. surendranathanii* were collected from Orukombankutty and nearby places. This species described by Shaji *et al.* from Chalakudy, Periyar and Pamba rivers of Kerala.

TABLE I  
LIST OF SPECIES RECORDED FROM CHALAKUDY RIVER

Sp. No.		Sp. No.	
	I Order: Elopiformes	4.	<i>Dayella malabarica</i> (Day)
	Family: Megalopidae		Family: Engraulidae
1.	<i>Megalops cyprinoides</i> (Broussonet)	5.	<i>Stolephorus commersonii</i> Lacepede
	II Order: Anguilliformes		IV Order: Cypriniformes
	Family: Anguillidae		Family: Cyprinidae
2.	<i>Anguilla bengalensis bengalensis</i>		Subfamily: Cyprininae
	(Gray & Hardwicke)	6.	<i>Catla catla</i> (Hamilton)
3.	<i>Anguilla bicolor bicolor</i> McClelland	7.	<i>Cirrhinus mrigala</i> (Hamilton)
	III Order: Clupeiformes	8.	<i>Cyprinus carpio communis</i>
	Family: Clupeidae		Linnaeus
	Subfamily: Pellonulinae	9.	<i>Hypselobarbus curmuca</i> (Hamilton)
		10.	<i>H. kolus</i> (Sykes)

FISH FAUNA, ABUNDANCE AND DISTRIBUTION

TABLE 1 (contd.)  
LIST OF SPECIES RECORDED FROM CHALAKUDY RIVER

Sp. No.		Sp. No.	
11.	<i>H. thomassi</i> Day*		Family: Cobitidae
12.	<i>Hypselobarbus jerdoni</i> (Day)		Subfamily: Cobitinae
13.	<i>H. micropogon</i> (Val.)*	52.	<i>Lepidocephalus thermalis</i> (Valenciennes)
14.	<i>H. pulchellus</i> Day*		V Order: Siluriformes
15.	<i>H. kurali</i> Menon & Rema Devi		Family: Bagridae
16.	<i>Labeo rohita</i> (Hamilton)	53.	<i>Horabagrus brachysoma</i> (Gunther)
17.	<i>L. calbasu</i> (Hamilton)*	54.	<i>H. nigricollaris</i> Pethiyagoda & Kottelat*
18.	<i>Osteobrama bakeri</i> (Day)	55.	<i>Pseudobagrus chryseus</i> (Day)*
19.	<i>Osteochilichthys longidorsalis</i> Pethiyagoda and Kottelat	56.	<i>Mystus gulio</i> (Hamilton)
20.	<i>O. thomassi</i> (Day)*	57.	<i>M. armatus</i> (Day)
21.	<i>Puntius amphibius</i> (Valenciennes)	58.	<i>M. cavasius</i> (Hamilton)
22.	<i>P. chola</i> (Hamilton)	59.	<i>M. malabaricus</i> (Jerdon)
23.	<i>P. denisonii</i> (Day)	60.	<i>M. oculatus</i> (Valenciennes)
24.	<i>P. dorsalis</i> (Jerdon)	61.	<i>M. vittatus</i> (Bloch)*
25.	<i>P. filamentosus</i> (Valenciennes)		Family: Siluridae
26.	<i>P. melanostigma</i> (Day)*	62.	<i>Ompok bimaculatus</i> (Bloch)
27.	<i>P. melanampyx</i> (Day)	63.	<i>O. malabaricus</i> (Valenciennes)
28.	<i>P. parrah</i> Day	64.	<i>Wallago attu</i> (Schneider)
29.	<i>P. ticto</i> (Hamilton)		Family: Sisoridae
30.	<i>P. vittatus</i> Day	65.	<i>Glyptothorax lonah</i> (Sykes)
31.	<i>Barbodes carnaticus</i> (Jerdon)	66.	<i>Glyptothorax madraspatanum</i> Day*
32.	<i>Barbodes sarana subnasutus</i> (Valenciennes)		Family: Clariidae
33.	<i>Tor khudree</i> (Sykes)	67.	<i>Clarias batrachus</i> (Linnaeus)
	Subfamily: Cultrinae		Family: Heteropneustidae
34.	<i>Salmostoma boopis</i> (Day)	68.	<i>Heteropneustes fossilis</i> (Bloch)
	Subfamily: Rasborinae		Family: Ariidae
35.	<i>Amblypharyngodon melettinus</i> (Valenciennes)	69.	<i>Arius caelatus</i> Valenciennes
36.	<i>Barilius bakeri</i> Day		VI Order: Cyprinodontiformes
37.	<i>B. bendelisis</i> (Hamilton)		Family: Hemirhamphidae
38.	<i>B. gatensis</i> (Valenciennes)	70.	<i>Hyporhamphus limbatus</i> (Valenciennes)
39.	<i>Danio aequipinnatus</i> (McClelland)		Family: Belontiidae
40.	<i>D. malabaricus</i> (Jerdon)	71.	<i>Xenentodon cancila</i> (Hamilton)
41.	<i>Esomus danricus</i> (Hamilton)		Family: Aplocheilidae
42.	<i>Parluciosoma daniconius</i> (Hamilton)	72.	<i>Aplocheilus lineatus</i> (Valenciennes)
	Subfamily: Garrinae	73.	<i>Aplocheilus panchax</i> (Hamilton)*
43.	<i>Garra lamta</i> (Hamilton)*		VII Order: Synbranchiformes
44.	<i>G. mcClellandi</i> Jerdon*		Family: Synbranchidae
45.	<i>G. mulya</i> (Sykes)	74.	<i>Ophisternon bengalense</i> McClelland*
46.	<i>G. surendranathanii</i> Shaji, Arun & Easa		VIII Order: Perciformes
	Family: Balitoridae		Family: Ambassidae
	Subfamily: Balitorinae	75.	<i>Parambassis thomassi</i> (Day)
47.	<i>Bhavana australis</i> (Jerdon)	76.	<i>Parambassis dayi</i> (Bleeker)
48.	<i>Travancoria elongata</i> Pethiyagoda & Kottelat*		Family: Teraponidae
49.	<i>Travancoria jonesi</i> Hora	77.	<i>Terapon jarbua</i> (Forsskal)
	Subfamily: Nemacheilinae		Family: Carangidae
50.	<i>Nemacheilus guentheri</i> Day	78.	<i>Caranx carangus</i> (Bloch)
51.	<i>N. triangularis</i> Day	79.	<i>Lutjanus argentimaculatus</i> (Forsskal)

TABLE 1 (contd.)  
LIST OF SPECIES RECORDED FROM CHALAKUDY RIVER

Sp. No.		Sp. No.	
	Family: Gerreidae		Family: Anabantidae
80.	<i>Gerres filamentosus</i> Cuvier	90.	<i>Anabas testudineus</i> (Bloch)
	Family: Sciaenidae		Family: Belontiidae
81.	<i>Macropsinosa cuja</i> (Hamilton)		Subfamily: Macropodinae
	Family: Scatophagidae	91.	<i>Macropodus cupanus</i> (Valenciennes)
82.	<i>Scatophagus argus</i> (Linnaeus)		Family: Channidae
	Family: Nandidae	92.	<i>Channa marulius</i>
	Subfamily: Pristolepidinae		(Hamilton-Buchanan)
83.	<i>Pristolepis marginatus</i> Jerdon	93.	<i>C. orientalis</i> Bloch and Schneider
	Subfamily: Nandinae	94.	<i>C. striatus</i> (Bloch)
84.	<i>Nandus nandus</i> (Hamilton)		Family: Mastacembelidae
	Family: Cichlidae	95.	<i>Macrogathus guentheri</i> (Day)
85.	<i>Etroplus maculatus</i> (Bloch)	96.	<i>Mastacembelus armatus</i> (Lecepede)
86.	<i>E. suratensis</i> (Bloch)		IX Order: Pleuronectiformes
87.	<i>Oreochromis mossambica</i> (Peters)		Family: Solteidae
	Family: Mugilidae	97.	<i>Euryglossa orientalis</i> (Bloch & Schneider)
88.	<i>Mugil cephalus</i> Linnaeus		X Order: Tetraodontiformes
	Family: Gobiidae		Family: Tetraodontidae
	Subfamily: Gobinae	98.	<i>Tetraodon travancoricus</i> Hora & Nair
89.	<i>Glossogobius giurus</i> (Hamilton)		

\*Recorded by previous workers

shows great resemblance to *G. mcClellandi* (Jerdon) in body form, position of the dorsal fin and number of lateral line scales. But it can be distinguished by the nature of spine in the tubercles. *G. mullya* and *G. menoni* differ from it in the number of lateral line scales. It differs from *G. hughi* (Silas) by the presence of scales in the mid-dorsal streak and from *G. gotyla stenorhyncus* (Jerdon) in the absence of a proboscis. This survey confirmed the presence of this species only in its type locality, Orukombankutty. This is the sixth type of species under the genus *Garra*, recorded from Kerala.

## 2. *Osteochilichthys longidorsalis*

Pethiyagoda & Kottelat

1994. *Osteochilichthys longidorsalis*, Pethiyagoda & Kottelat, *J. South Asian nat. Hist.*, 1(1): 97-116

The first report of this species was from Chalakudy river, near Vettilappara (type locality), 26 km upstream of Chalakudy town. During the present survey, one specimen of this species was collected from the Parambikulam river, tributary

of Chalakudy river, two kilometres away from Orukombankutty. This species has distinctive characters from all other species of the genus in having 10 branched rays and a markedly elongate last simple dorsal fin ray. It differs from *O. thomassi* in the absence of a dark lateral stripe, by having a shallower body, and not having a fimbriated upper lip. It can be distinguished from *O. nashii* by having a shallower body and by the absence of a dark blotch on the dorsal fin. The present report of this species is the second one from Kerala from the same river.

## 3. *Barilius bendelisis* (Hamilton)

*B. bendelisis* (Ham.) is one of the principal hillstream fish in the rivers of Jammu. It is characterised by eight to twelve dark bands descending towards the lateral line which become indistinct as spots in adults and lateral line scales with two black spots at their base. It was considered to be present throughout India except Kerala (Talwar and Jhingran 1991). It was reported from Periyar lake, Thekkady by Chacko (1948), but later Jayaram (1981), Talwar and

Jhingran (1991) considered this as erroneous. Easa and Shaji (1996) have reported this species from the east flowing Pambar river, Chinnar Wildlife Sanctuary, Kerala. This report confirmed its occurrence in Kerala.

During the present survey six specimens of this species were collected from Thekkadiar tributary of Chalakudy river in Parambikulam Wildlife Sanctuary area. This is the first report of this species from a west flowing river in Kerala (Raju Thomas *et al.* 1998).

#### 4. *Glyptothorax lonah* (Sykes)

Six specimens of *G. lonah* were collected from Karappara river in Parambikulam Wildlife Sanctuary area and also from Nelliampathy area. The known distribution of this species was Deccan plateau, Godavari and Krishna river systems. Silas (1951) extended its distribution to the headwaters of Cauvery river. It was first reported from Kerala by Biju *et al.* (1998). A small description of this species is given below:

Body elongate, head depressed, as long as broad; occipital process about 4 times as long as broad, apposed to basal bone of dorsal fin. Maxillary barbels extend posteriorly to anterior third of pectoral fins. Adhesive apparatus longer than broad, without a central pit. Dorsal fin inserted nearer to adipose fin than to snout tip.

#### 5. *Horabagrus nigricollaris*

Pethiyagoda & Kottelat

Type locality of this species is Chalakudy river, 26 km upstream of Chalakudy town, near Vettilappara. It is distinguished from *H. brachysoma* by the colour pattern; it has a black saddle shaped bar extending across the dorsum from the humeral region of each side; and also by having a shorter head, a larger eye, a broader pectoral girdle, a longer dorsal spine and a smaller distance between the dorsal origin and coracoid. The two species also differ in the shape of the adipose fin, in *H. nigricollaris*, the dorsal profile of the adipose fin is continuous with the dorsal profile of the dorsum anterior to it. During the present study, this fish has not been located anywhere in this river.

#### 6. *Travancoria elongata*

Pethiyagoda & Kottelat

This species was also described from the Chalakudy river near Vettilappara. It is distinguished from its only congener in having a more slender body, a longer and more slender caudal peduncle, and lobes of the rostral cap between the rostral barbels present, but not developed into barbel-like projections. During the present study, it has not been located in this river.

#### 7. *Tetraodon travancoricus*

Hora and Nair

This is a small species, less than an inch in length. Hora and Nair (1941) described this fish from Pambar river, Kerala. In the present survey, 75 specimens of this fish were collected from Kanakkankadavu area, Ernakulam district. This is the first report of this species from this river.

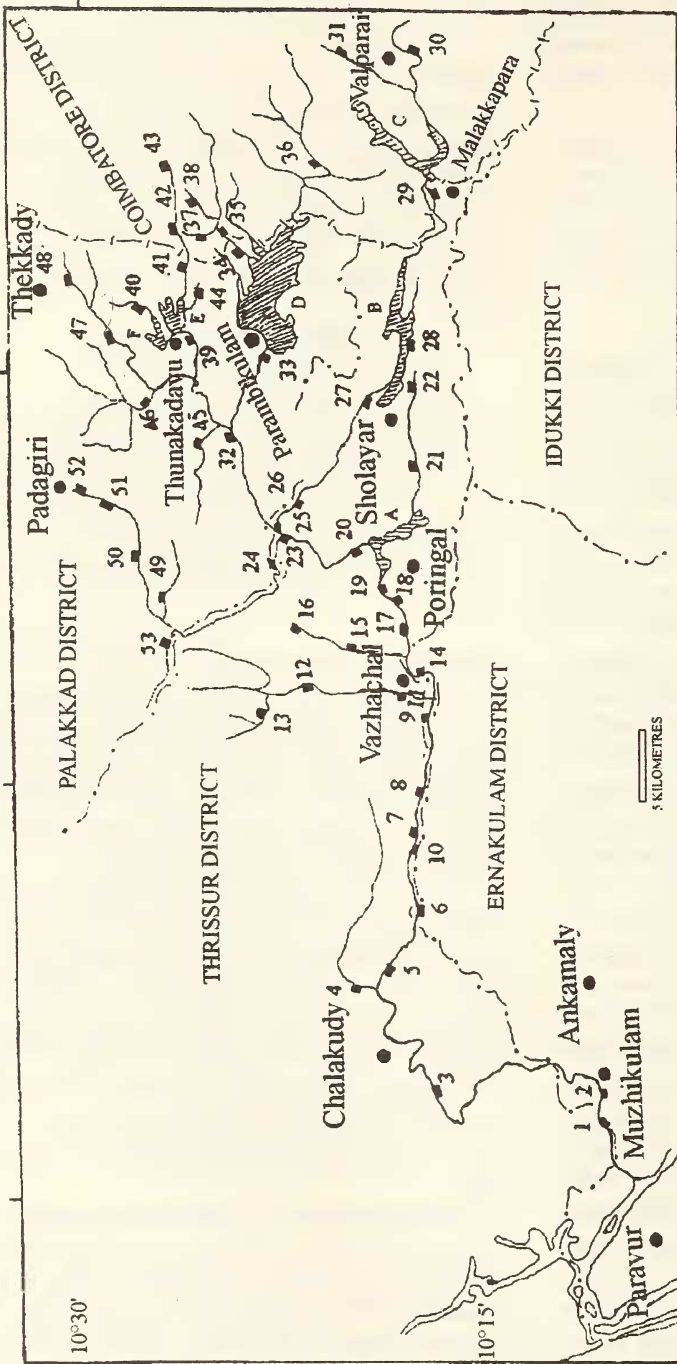
### Distribution and abundance of fishes

Samples were collected from 53 locations (Fig. 1), mainly in two seasons, viz, summer and post-monsoon periods. Separate collections were taken from lowland, midland, highland and high range areas. Distribution of various species under each altitudinal area is given in Table 2.

A total of 61 species were recorded from lowland areas, out of which 26 were specific to this zone. In this survey, 12 species of migratory or secondary freshwater fishes were obtained (Table 3). Most of the migratory or secondary freshwater fishes were restricted to the lowland area except *Megalopes cyprinoides* and *Euryglossa orientalis*, which were reported even 50 km away from the sea coast in the midland area.

*Macrospinosa cuja* is the first report from the freshwaters of Kerala. It was reported primarily from the Gangetic estuary. Hence its record from Kerala is interesting. The presence of this species in this river may be due to its introduction, considering its commercial value.

Fig. 1: Map of Chalakudy river showing various collection sites and reservoirs



Collection sites

- |                   |                     |                    |                    |                   |
|-------------------|---------------------|--------------------|--------------------|-------------------|
| 1. Kanakkankadavu | 21. Anakayam        | 31. Valparai-a     | 41. Anappady       | 51. Karappara-a   |
| 2. Muzhikulam     | 22. Anakayam-a      | 32. Kuriarkutty    | 42. Kozhikamathy   | 52. Nelliampathy  |
| 3. Kadukutty      | 23. Karaparakutty   | 33. Parambikulam   | 43. Kozhikamathy-a | 53. Pullaikkal    |
| 4. Pariyaram      | 24. Karaparakutty-a | 34. Varakiliyar    | 44. Sichali thodu  | <b>Reservoirs</b> |
| 5. Pulani         | 25. Orukombankutty  | 35. Parakiliyar-a  | 45. Pulikal        | A. Poringalkuthu  |
| 6. Adichily       | 26. Orukomban       | 36. Panathiar      | 46. Vetiar         | B. Sholayar       |
| 7. Arurmuzhi      | 27. Sholayar        | 37. Meenmetupallam | 47. Thekkady       | C. Malakkapara    |
| 8. Vettilapara    | 28. Ambalapara      | 38. Koorampallyar  | 48. Thekkady-a     | D. Parambikulam   |
| 9. Pillapara      | 29. Malakkapara     | 39. Thunakadavu    | 49. Chakkali       | E. Thunakadavu    |
| 10. Ezhattumugam  | 30. Valparai        | 40. Sungam         | 50. Karappara      | F. Peruvuripallam |

FISH FAUNA, ABUNDANCE AND DISTRIBUTION

TABLE 2  
DISTRIBUTION AND STATUS OF FISHES IN DIFFERENT ALTITUDINAL ZONES IN CHALAKUDY RIVER SYSTEM

No.	Species	#1	#2	#3	#4	Status	GT
1.	<i>Stolephorus commersonii</i>	+				Migratory	
2.	<i>Anguilla bicolor bicolor</i>	+				Rare	
3.	<i>Hypselobarbus kurali</i>	+				Rare	
4.	<i>Puntius denisoni</i>	+				Rare	
5.	<i>Tetraodon travancoricus</i>	+				Rare	
6.	<i>Horabagrus brachysoma</i>	+				Common	
7.	<i>Mystus gulio</i>	+				Migratory	
8.	<i>Mystus cavasius</i>	+				Common	
9.	<i>Heteropneustes fossilis</i>	+				Rare	
10.	<i>Arius caelatus</i>	+				Migratory	
11.	<i>Hyporhamphus limbatus</i>	+				Common	
12.	<i>Wallago attu</i>	+				Rare	
13.	<i>Labeo calbasu*</i> ,***	-				Not found	
14.	<i>Terapon jarbua</i>	+				Migratory	
15.	<i>Caranx carangus</i>	+				Migratory	
16.	<i>Lutjanus argentimaculatus</i>	+				Migratory	
17.	<i>Gerres filamentosus</i>	+				Migratory	
18.	<i>Macrospinoso cuja</i>	+				Migratory	
19.	<i>Scatophagus argus</i>	+				Migratory	
20.	<i>Nandus nandus</i>	+				Rare	
21.	<i>Mugil cephalus</i>	+				Migratory	
22.	<i>Macropodus cupanus</i>	+				Common	
23.	<i>Aplocheilichthys panchax***</i>	-				Not found	
24.	<i>Pseudobagrus chryseus*</i>	-				Not found	
25.	<i>Puntius melanostigma***</i>	-				Not found	
26.	<i>Parambassis dayi</i>	+				Common	26
27.	<i>Anguilla bengalensis bengalensis</i>	+	+			Common	
28.	<i>Megalops cyprinoides</i>	+	+			Migratory	
29.	<i>Dayella malabarica</i>	+	+			Common	
30.	<i>Hypselobarbus jerdoni</i>	+	+			Common	
31.	<i>Puntius ticto</i>	+	+			Very Common	
32.	<i>Puntius vittatus</i>	+	+			Very Common	
33.	<i>Channa orientalis</i>	+	+			Common	
34.	<i>Channa striatus</i>	+	+			Common	
35.	<i>Barbodes sarana subnasutus</i>	+	+			Very Common	
36.	<i>Osteobrama bakeri</i>	+	+			Common	
37.	<i>Clarias batrachus</i>	+	+			Common	
38.	<i>Mystus oculatus</i>	+	+			Common	
39.	<i>Xenentodon cancila</i>	+	+			Common	
40.	<i>Mastacembelus armatus</i>	+	+			Common	
41.	<i>Euryglossa orientalis</i>	+	+			Migratory	
42.	<i>Parambassis thomassi</i>	+	+			Common	
43.	<i>Glossogobius giuris</i>	+	+			Common	
44.	<i>Anabas testudineus</i>	+	+			Common	
45.	<i>Hypselobarbus pulchellus***, **</i>	-	-			Not found	19
46.	<i>Salmostoma boopis</i>		+			Common	
47.	<i>Amblypharyngodon melettinus</i>		+			Common	
48.	<i>Garra surendranathanii</i>		+			Rare	
49.	<i>Cyprinus carpio communis</i>		+			Introduced	
50.	<i>Puntius chola</i>		+			Common	
51.	<i>Osteochilichthys longidorsalis</i>		+			Rare	
52.	<i>Puntius parrah</i>		+			Common	



FISH FAUNA, ABUNDANCE AND DISTRIBUTION

TABLE 2  
DISTRIBUTION AND STATUS OF FISHES IN DIFFERENT ALTITUDINAL ZONES IN CHALAKUDY RIVER SYSTEM

No.	Species	#1	#2	#3	#4	Status	GT
53.	<i>Hypselebarbus kolus</i>		+			Very rare	
54.	<i>H. micropogon</i> **		-			Not found	
55.	<i>H. thomassi</i> *		-			Not found	
56.	<i>Osteochilichthys thomassi</i> **		-			Not found	
57.	<i>Garra lamta</i> *		-			Not found	
58.	<i>G. mcClellandi</i> **		-			Not found	
59.	<i>Horabagrus nigricollaris</i> ****		-			Not found	
60.	<i>Travancoria elongata</i> ****		-			Not found	
61.	<i>Mystus vittatus</i> **		-			Not found	
62.	<i>Ophisternon benglense</i> *		-			Not found	17
63.	<i>Barbodes carnaticus</i>		+	+		Rare	
64.	<i>Puntius dorsalis</i>		+	+		Common	
65.	<i>Catla catla</i>		+	+		Introduced	
66.	<i>Cirrhinus mrigala</i>		+	+		Introduced	
67.	<i>Labeo rohita</i>		+	+		Introduced	
68.	<i>Hypselebarbus curmuca</i>		+	+		Rare	
69.	<i>Barilius bakeri</i>		+	+		Common	
70.	<i>Esomus danricus</i>		+	+		Rare	
71.	<i>Bhavana australis</i>		+	+		Rare	
72.	<i>Mystus malabaricus</i>		+	+		Common	
73.	<i>Pristolepis marginata</i>		+	+		Common	
74.	<i>Macrornathus guentheri</i>		+	+		Common	
75.	<i>Glyptothorax madraspatanum</i> **,*		-	-		Not found	13
76.	<i>Mystus armatus</i>	+	+	+	+	Very common	
77.	<i>Puntius amphibius</i>	+	+	+	+	Very common	
78.	<i>P. filamentosus</i>	+	+	+	+	Very common	
79.	<i>P. melanampyx</i>	+	+	+	+	Very common	
80.	<i>Danio aequipinnatus</i>	+	+	+	+	Very common	
81.	<i>Danio malabaricus</i>	+	+	+	+	Very common	
82.	<i>Parluciosoma daniconius</i>	+	+	+	+	Very common	
83.	<i>Garra mullya</i>	+	+	+	+	Very common	
84.	<i>Nemacheilus triangularis</i>	+	+	+	+	Common	
85.	<i>Etroplus maculatus</i>	+	+	+	+	Very common	
86.	<i>Oreochromis mossambica</i>	+	+	+	+	Introduced and very common	11
87.	<i>Aplocheilus lineatus</i>	+	+	+		Very common	
88.	<i>Etroplus suratensis</i>	+	+	+		Common	
89.	<i>Channa marulius</i>	+	+	+		Common	
90.	<i>Lepidocephalus thermalis</i>	+	+	+		Very common	
91.	<i>Tor khudree</i>	+	+	+		Rare	5
92.	<i>Ompok bimaculatus</i>	+		+		Common	
93.	<i>Barilius gatensis</i>		+	+	+	Common	
94.	<i>Nemacheilus guentheri</i>		+	+	+	Common	
95.	<i>Barilius bendelisis</i>			+		Rare	
96.	<i>Ompok malabaricus</i>			+		Common	
97.	<i>Travancoria jonesi</i>			+		Very rare	
98.	<i>Glyptothorax lonah</i>			+	+	Very rare	7
Total		61	68	36	14		

\* Thobias, 1973; \*\* Antony, 1977; \*\*\* Inasu, 1991; \*\*\*\* Pethiyagoda & Kottelat, 1994

Species recorded in various altitude zones

# 1. <75 m above msl #2. 76-500m above msl #3. 501-750m above msl #4. >750m above msl; GT -Group Total

TABLE 3  
SECONDARY FRESHWATER FISH DISTRIBUTION IN THE CHALAKUDY RIVER

Species	Nature of Species	#1	#2	#3	#4	Abundance
<i>Stolephorus commersonii</i>	Coastal pelagic	+				Common
<i>Mystus gulio</i>	Estuarine	+				Common
<i>Arius caelatus</i>	Estuarine	+				Rare
<i>Terapon jarbua</i>	Coastal	+				Common
<i>Caranx carangus</i>	Marine	+				Rare
<i>Lutjanus argentimaculatus</i>	Estuarine	+				Rare
<i>Gerres filamentosus</i>	Coastal	+				Rare
<i>Macropsinosa cuja</i>	Estuarine	+				Very rare
<i>Scatophagus argus</i>	Estuarine	+				Rare
<i>Mugil cephalus</i>	Estuarine	+				Common
<i>Euryglossa orientalis</i>	Coastal	+	+			Rare
<i>Megalops cyprinoides</i>	Coastal pelagic	+	+			Common

Species recorded in various altitude zones

#1. <75 m above msl; #2. 76-500 m above msl; #3. 501-750 msl; #4. >750 m above msl

Highest number of species (68) was recorded from midland, whereas the least number of species (14) from the high ranges. In the lowland and midland areas freshwater fish diversity was very high. This may be due to the presence of migratory fishes and the deep waterbodies sufficient for the fish life in these areas in all seasons. Moreover, the paddy fields or the wetlands are also connected with the lowlands. Besides these, during the summer months fishes from upstream migrated towards the lower reaches and midland areas.

19 species were found both in the lowland and midland areas, whereas 17 species were found only in the midland area, out of which 9 previously recorded species were not located during the present study. 13 species were collected from both the midland and highland areas.

Of the total fishes obtained, 15 species were found to be very common, out of which 11 had a uniform distribution throughout the river system. 34 species were common while 15 were rare. Six species were considered very rare, namely *Hypselobarbus thomassi*, *Labeo calbasu*, *Glyptothorax madraspatanm* (past records), *Hypselobarbus kolus*, *Glyptothorax lonah* and *Travancoria jonesi*. Five species from those collected were introduced species. Among the

introduced species *Oreochromis mossambica* was one of the well established fishes and it was recorded from all the four zones. Though *Garra mullya* is modified to survive in the hill streams, this species was found seasonally in various zones. *G. lonah*, *T. jonesi*, *Ompok malabaricus* and *Barilius bendelisis* were restricted to highland or high ranges.

During the present survey, we were not able to collect 15 species that were recorded by earlier workers and are marked with asterisk in Tables 1 & 2. Of these 15 species, *Labeo calbasu* can be considered as locally endangered. *Hypselobarbus kolus* is being considered as a synonym of *Hypselobarbus curmuca* (Menon, in press).

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